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EXAMINER	
HEIDEMANN, JASON E	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	**Application No.** 10/585,255	**Applicant(s)** KONDO ET AL.	
	Examiner Jason Heidemann	**Art Unit** 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07/31/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29,31,33-37 and 43-47* is/are rejected.

7)☒ Claim(s) *4,30,32 and 38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *08/11/2008 and 07/05/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-47 are pending

Priority

This application claims benefit of a National Stage Application No. PCT/JP05/00063, filed 01/06/2005.

This application claims Foreign Priority to JP2004-077399, filed 03/18/2004, JP2004-077398, filed 03/18/2004, and JP2004-000752, filed 01/06/2004

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 47 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 47 define a program comprising program code, the program code causing a computer to execute” (i.e., a computer program or computer executable code). However, the claim does not define a “computer-readable medium or computer-readable memory” and is thus non-statutory for that reason (When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized). The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests amending the claim(s) to embody the program on “computer-readable medium” or equivalent; assuming the specification does NOT define the computer readable medium as a “signal”, “carrier wave”, or “transmission medium” which are deemed non-statutory (refer to “note” below). Any amendment to the claim should be commensurate with its corresponding disclosure.

Note:

“A transitory, propagating signal … is not a “process, machine, manufacture, or composition of matter.” Those four categories define the explicit scope and reach of subject matter patentable under 35 U.S.C. § 101; thus, such a signal cannot be

patentable subject matter." (In re Nuijten, 84 USPQ2d 1495 (Fed. Cir. 2007). **Should the full scope of the claim as properly read in light of the disclosure encompass non-statutory subject matter such as a "signal", the claim as a whole would be non-statutory. Should the applicant's specification define or exemplify the computer readable medium or memory (or whatever language applicant chooses to recite a computer readable medium equivalent) as statutory tangible products such as a hard drive, ROM, RAM, etc, as well as** a non-statutory entity such as a "signal", "carrier wave", or "transmission medium", the examiner suggests amending the claim to *include* the disclosed tangible computer readable storage media, while at the same time *excluding* the intangible transitory media such as signals, carrier waves, etc.

Merely reciting functional descriptive material as residing on a "tangible" or other medium is not sufficient. If the scope of the claimed medium covers media other than "computer readable" media (e.g., "a tangible media", a "machine-readable media", etc.), the claim remains non-statutory. The full scope of the claimed media (regardless of what words applicant chooses) should not fall outside that of a computer readable medium.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 5, 6, 7, 9-13, 20, 43, 46, and 47 rejected under 35 U.S.C. 102(b) as being anticipated by Sun, et al. (US Patent #6731799 B1, hereinafter Sun).

As to Claim 1, Sun teaches an image processing apparatus (Sun, Fig.1) comprising: position estimating means (Sun, Fig.2, El 28) for estimating the position of a second point representing a tracking point in an image of a temporally next (*frame*) unit of processing (Sun, Column 7, Lines 49-53, Lines 59-66, Column 8, 32-35, estimates the position of an edge point(s) of an object using an auto-predicative search, to track the edge point(s) in the temporally next frame),the second point corresponding to a first point representing the tracking point in an image of a temporally previous unit of processing (Sun, Fig. 10A, Fig. 10B, Column 1, Lines 22-25, Column 8, Lines 29-33); generating means for generating estimated points serving as candidates of the first point when the position of the second point is inestimable (Sun, Column 8, Lines 26-29, if a scene change is detected (a second point is inestimable) then the process is reinitialized (building new models and tracking new points)); determining means for determining the second point in the next unit of processing on the basis of the estimation result of the position estimating means when the position of the second point in the next unit of processing is estimable (Sun, Column 7, Lines 49-53, Lines 59-66, Column 8, 32-35, if a scene change has not occurred (the second point is estimable) then the position of an edge point of an object is estimated using an auto-predicative search which tracks the edge point in the temporally next frame); and selecting means

for selecting the first point from among the estimated points when the position of the second point is inestimable (Sun, Column 8, Lines 26-29, Column 7, Lines 38-46, if a scene change is detected (a second point is inestimable) then the process is reinitialized, where the user can select point(s) for tracking (selecting means) or the computer can perform a segmentation to generate the new edge point(s) to track (selecting means)).

As to Claim 2, Sun teaches the image processing apparatus according to claim 1, wherein the unit of processing is a frame (Sun, Column 7, Lines 49-53, Lines 59-66, Column 8, 32-35, to tracks point(s) between frames).

As to Claim 5, Sun teaches the image processing apparatus according to claim 1, wherein, if the position of the second point is estimable, (Sun, Fig. 4, Column 7, Lines 49-53, Lines 59-66, Column 8, 32-35, if a scene change has not occurred (the second point is estimable) then the position of an edge point of an object is estimated) the position estimating means considers the position of the second point to be a new first point (Sun, Fig. 4, Column 8, 55-61, after estimating the position of the object, the object's boundry is refined with the current image frame) and estimates the position of the tracking point in the image of the next unit of processing (Sun, Fig. 4, Column 8, 64-67, the object is segmented (updated model of points) at each frame and tracked over many frames).

As to Claim 6, Sun teaches the image processing apparatus according to claim 1, wherein the generating means includes region estimating means for estimating a set of at least one point (Sun, Fig. 3, Fig. 4, Column 8, 55-61,); the set belonging to an object including the first point to be a target region in the previous unit of processing or in a more previous unit of processing than the previous unit of processing (Sun, Fig. 3, Fig. 4, Column 8, 55-61,); and estimated point generating means for generating the estimated points on the basis of the target region (Sun, Fig. 3, Fig. 4, Column 8, 55-61).

As to Claim 7, Sun teaches the image processing apparatus according to claim 6,

wherein the region estimating means finds a position that overlaps at least the target region serving as an object to be estimated by prediction (Sun, Fig. 3, Fig. 4, Column 8, 55-61,), determines a region estimation range at the predicted point including the tracking point in the unit of processing for estimating the target region (Sun, Fig. 3, Fig. 4, Column 8, 55-61, determines a motion boundary (region estimation range) for updating the object boundary), sets sample points in the determined region estimation range (Sun, Fig. 3, Fig. 4, Column 8, 55-61, “edge points”), and estimates a region consisting of a set of the sample points having the same motion and having the largest dimensions among the sample points to be the target region (Sun, Fig. 3, Fig. 4, Column 3, Lines 1-31, Column 8, 55-61,).

As to Claim 9, Sun teaches the image processing apparatus according to claim 7, wherein the shape of the region estimation range is variable (Sun, Column 7, Lines 40-48, Lines 59-67,the template is constructed with an active contour, following the edges in the image, the initial template is always changing for each frame processed – the region is therefore variable).

As to Claim 10, Sun teaches the image processing apparatus according to claim 7, wherein the region estimating means estimates the target region in a more previous unit of processing than the previous unit of processing (Sun, Column 7, Lines 38-50) and wherein the generating means generates a point in the estimated target region in the more previous unit of processing than the previous unit of processing as the estimated point (Sun, Column 7, Lines 49-66).

As to Claim 11, Sun teaches the image processing apparatus according to claim 7, wherein the region estimating means estimates the target region in the previous unit of processing and wherein the generating means generates a point forming the target region as the estimated point (Sun, Column 7, Lines 38-66, Fig. 4, Column 8, 14-25).

As to Claim 12, Sun teaches the image processing apparatus according to claim 6, wherein the region estimating means estimates points that are adjacent to the first

point and that have pixel values similar to the pixel value of the first point and points that are adjacent to the points adjacent to the first point to be the target region (Sun, Column 7, Lines 38-66, Sun estimated the region based on edges, thus the interior to the region is homogeneous and therefore the region estimating means estimates points that are adjacent to the first point and that have pixel values similar to the pixel value of the first point points that are adjacent to the points adjacent to the first point to be the target region).

As to Claim 13, Sun teaches the image processing apparatus according to claim 6, wherein the region estimating means extracts sample points in a region having a predetermined size (Sun, Fig. 13, Fig. 11, Sun shows the trivial case of using the entire frame after motion has been established (predetermined size) for region estimation, Column 8, Lines 38-67) and including the first point in a more previous unit of processing than the previous unit of processing (Sun, Fig. 13, Fig 11) and

wherein the region estimating means estimates a region including the points in the previous unit of processing obtained by shifting a region of the sample points having the same motion and having the largest dimensions by an amount of the same motion to be the target region (Sun, Fig. 13, Column 12, Lines 21-36).

As to Claim 20, Sun teaches the image processing apparatus according to claim 1, further comprising: detecting means for detecting a scene change (Sun, Column 8,

Lines 16-28, Column 9, Lines 28-35, and Fig.3, el 88, teaches detecting a scene change using a scene change algorithm); wherein the position estimating means and the selecting means terminate the processes thereof on the basis of a predetermined condition (Sun, Column 8, Lines 26-38, and Fig.3, el 88, if a scene change (predetermined contition) is detected, the process is complete or re-initialized (terminate the process) to track a new object and create a new background model) and change the condition on the basis of the presence of the scene change when the position estimating means and the selecting means are unable to select the second point from among the estimated points (Sun, Column 8, Lines 16-38, a mehod is used to indentify a scene change has occurred which would cause the tracking process to be complete or re-initialized, since the point(s) could not longer be tracked).

As to Claim 43, Sun teaches an image processing method comprising: an estimating step for estimating the position of a second point representing a tracking point in an image of a temporally next unit of processing (Sun, Column 7, Lines 49-53, Lines 59-66, Column 8, 32-35, estimates the position of an edge point(s) of an object using an auto-predicative search, to track the edge point(s) in the temporally next frame), the second point corresponding to a first point representing the tracking point in an image of a temporally previous unit of processing (Sun, Fig. 10A, Fig. 10B); a generating step for generating estimated points serving as candidates of the first point when the position of the second point is inestimable (Sun, Column 8, Lines 26-29, if a scene change is detected (a second point is inestimable) then the process is

reinitialized (building new models and tracking new points)); a determining step for determining the second point in the next unit of processing on the basis of the estimation result of the position estimating step when the position of the second point in the next unit of processing is estimable (Sun, Column 7, Lines 49-53, Lines 59-66, Column 8, 32-35, if a scene change has not occurred (the second point is estimable) then the position of an edge point of an object is estimated using an auto-predicative search which trackes the edge point in the temporally next frame); and a selecting step for selecting the first point from among the estimated points when the position of the second point is inestimable (Sun, Column 8, Lines 26-29, Column 7, Lines 38-46, if a scene change is detected (a second point is inestimable) then the process is reinitialized, where the user can select point(s) for tracking (selecting means) or the computer can perform a segmentation to generate the new edge point(s) to track (selecting means)).

With respect to Claim 46, it includes essentially the same limitations as Claims 1 respectively as addressed above. Further, Sun teaches a computer readable medium, “A recording medium storing a computer-readable program, the computer-readable program comprising” (Sun, Fig.1, Fig.2, Column 4, Lines 47-60,).

With respect to Claim 47, it includes essentially the same limitations as Claims 1 respectively as addressed above. Further, Sun teaches a computer program, “A

program comprising program code, the program code causing a computer to execute" (Sun, Fig.1, Fig.2, Column 4, Lines 1-60).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

A.) Claims 3, 4, 21-28, 33-34, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun in view of Margarey (US PGPub #2003/0053661 hereinafter Margarey).

As to Claim 3, Sun teaches the image processing apparatus according to claim 1. However, Sun does not explicitly teach wherein the position estimating means further computes the accuracy of the estimation of the position and wherein, if the computed accuracy is greater than a reference value, the position estimating means determines that the position of the second point is estimable.

Margarey teaches a position estimating means further computes the accuracy of the estimation (Margarey, Fig. 5A, el 517) of the position and wherein, if the computed accuracy is greater than a reference value, the position estimating means determines

that the position of the second point is estimable (Margarey, Fig. 5A, el 517, 523, [0008], Lines 1-5, [0087], Lines 1-12, the determination of whether a Loss-of-Track, LOT, (position is estimable or inestimable) has occurred is based on using a threshold on the pixel differences between a reference data set an the feature set), this value represents accuracy (a difference of 0, would be exact match, a larger number would correspond to a poorer match), and if this accuracy value is under a predetermined threshold the LOT is not flagged (estimable)). Margarey performs the accuracy estimating process to determine whether a track can be determined or to flag a loss of track, as described by Margarey at paragraphs [0007] - [0008].

It would have been obvious to one of ordinary skilled in the art at the time of inventions to modify the image processing apparatus of Sun, by additionally performing the loss of track determination operation as shown in Fig.6 of Margarey on the feature vectors of temporal images acquired by Sun according to the teaching of Margarey. Sun and Margarey are analogous in the art of image processing specifically in the field of object tracking, and Margarey addresses the same problem solving area of image based tracking of objects to determine if the object's location is estimable in the current frame. One of ordinary skilled in the art would have been motivated to combine the teachings of Margarey to the apparatus of Sun in order to use the images obtained from Sun's image processing apparatus and then determine if a Loss-of-Track has occurred or if the track is still accurate in the manner described by Margarey to provide a robust, quick, adaptive, and repeatable approach to tracking regions when issues such as

occlusion occurs through a sequence of images (Margarey, [0006], [0007], [0008], [00017]).

Further, Sun and Margarey collectively teach all of the claimed elements, the teaching of Margarey performs the same function in combination with Sun as taught individually in Margarey, and the results would be highly predictable (the determination of whether a track is accurate in a sequence of images).

As to Claim 4, Sun teaches the image processing apparatus according to claim 1. However, Sun does not explicitly teach wherein, if the position of the second point in the next unit of processing is inestimable the position estimating means estimates the position of the second point on the basis of the first point selected by the selecting means.

Margarey teaches wherein, if the position of the second point in the next unit of processing is inestimable the position estimating means estimates the position of the second point on the basis of the first point selected by the selecting means (Margarey, [0008], Lines 1-12, [0009], Lines 1-12, [0088], Lines 1-7, and [0087], Lines 7-11, when a Loss Of Track (LOT) condition is detected, the measurement update is bypassed and the system returns the previous predicated state vector (the position is estimated on the basis of the previous (first) point)). Margarey performs the bypass of the movement updated process to avoid tracking issues when a track is lost, as described by Margarey at paragraphs [0007] - [0008], [0087].

It would have been obvious to one of ordinary skilled in the art at the time of inventions to modify the image processing apparatus of Sun, by additionally performing the bypassing of updating the tracking position if a loss of track has been determined as shown in Fig.6 of Margarey on the feature vectors of temporal images acquired by Sun according to the teaching of Margarey. Sun and Margarey are analogous in the art of image processing specifically in the field of object tracking, and Margarey addresses the same problem solving area of image based tracking of objects to determine if the object's location is estimable in the current frame. One of ordinary skilled in the art would have been motivated to combine the teachings of Margarey to the apparatus of Sun in order to use the images obtained from Sun's image processing apparatus and then determine if a Loss-of-Track has occurred or if the track is still accurate in the manner described by Margarey to provide a robust, quick, adaptive, and repeatable approach to tracking regions when issues such as occlusion occurs through a sequence of images (Margarey, [0006], [0007], [0008], [00017]).

Further, Sun and Margarey collectively teach all of the claimed elements, the teaching of Margarey performs the same function in combination with Sun as taught individually in Margarey, and the results would be highly predictable (when a loss of track is detected to use the previous detected track as the current).

As to Claim 21 and Claim 44, Sun teaches the image processing apparatus according to claim 1 and the method according to claim 43, respectively. However, Sun

does not explicitly teach wherein the determining means includes: evaluation value computing means for computing an evaluation value representing a correlation between pixels of interest representing at least one pixel including the first point in the temporally previous unit of processing and the corresponding pixels representing at least one pixel in the temporally next unit of processing and defined on the basis of a motion vector of the pixels of interest; variable value computing means for computing a variable value representing the variation of a pixel value with respect to the pixels of interest; and accuracy computing means for computing the accuracy of the motion vector.

Margarey teaches the a computing means for computing an evaluation value representing a correlation between pixels of interest representing at least one pixel including the first point in the temporally previous unit of processing and the corresponding pixels representing at least one pixel in the temporally next unit of processing and defined on the basis of a motion vector of the pixels of interest (Margarey, Fig. 2A, Fig. 2B, [0008], Lines 1-12, [0009], Lines 1-12, [0081], Lines 104, [0088], Lines 1-7, and [0087], Lines 1-12, an evaluation means, Loss Of Target, (position is estimable or inestimable) is determined by comparing (correlation taught as a suitable method) the pixel between a reference data set (data from a previous frame) an the feature set (data extracted based on region around a position estimated by the motion vector)); variable value computing means for computing a variable value representing the variation of a pixel value with respect to the pixels of interest (Margarey, [0008], Lines 1-5, [0087], Lines 1-12, a (variable) value represents the difference (variation) between pixel values of the reference data set and the feature set

(pixels of interest)); and accuracy computing means for computing the accuracy of the motion vector (Margarey, [0008], Lines 1-5, [0087], Lines 1-12, the accuracy of the motion vector is determined using a threshold on the pixel differences between a reference data set an the feature set), this value represents accuracy (a difference of 0, would be exact match, a larger number would correspond to a poorer match), and if this accuracy value is under a predetermined threshold the accuracy of the new motion vector is not used, rather the pervious position is used).

It would have been obvious to one of ordinary skilled in the art at the time of inventions to modify the image processing apparatus of Sun, by additionally computing an evaluation value, variable value, in order to determine the accuracy of the motion vector as taught by Margarey above. Sun and Margarey are analogous in the art of image processing specifically in the field of object tracking, and Margarey addresses the same problem solving area of image based tracking of objects to determine if the object's location is estimable in the current frame. One of ordinary skilled in the art would have been motivated to combine the teachings of Margarey to the apparatus and method of Sun in order to use the images obtained from Sun's image processing apparatus/method and then determine if the motion vector is accurate by evaluating the correlation value between the feature vectors in the manner described by Margarey to provide a robust, quick, adaptive, and repeatable approach to tracking regions when issues such as occlusion occurs through a sequence of images (Margarey, [0006], [0007], [0008], [00017]).

Further, Sun and Margarey collectively teach all of the claimed elements, the teaching of Margarey performs the same function in combination with Sun as taught individually in Margarey, and the results would be highly predictable (using a correlation between features to determine if the motion vector is accurate).

As to Claim 22, the combination of Sun and Margarey teach the image processing apparatus according to claim 21, wherein the number of the pixels of interest is equal to the number of the corresponding pixels (<u>Margarey, [0087], pixels are compared in blocks</u>)

As to Claim 23, the combination of Sun and Margarey teach the image processing apparatus according to claim 21, wherein the variable value indicates the variation of a pixel value in the spatial direction pixels (<u>Margarey, Fig. 2B, Lines 1-5, [0026], [0077], [0081], [0087], pixels are compared in blocks</u>)

.

As to Claim 24, the combination of Sun and Margarey teach the image processing apparatus according to claim 21, wherein the variable value indicates one of a degree of dispersion and a dynamic range (<u>Margarey, [0008], Lines 1-5, [0087], Lines 1-12, a (variable) value represents the difference (variation) between pixel values in a</u>

block of the reference data set and the block of feature set (pixels of interest, therefore the sum of difference in the block represents the degree of dispersion).

As to Claim 25, the combination of Sun and Margarey teach the image processing apparatus according to claim 21, wherein the unit of processing is one of a frame and a field (Sun, Column 7, Lines 49-53, Lines 59-66, Column 8, 32-35, to tracks point(s) between frames).

As to Claim 26, the combination of Sun and Margarey teach the image processing apparatus according to claim 21, wherein the accuracy computing means computes the accuracy of the motion vector on the basis of a value normalized from the evaluation value with respect to the variable value (Margarey, Fig. 2A, Fig. 2B, [0008], Lines 1-12, [0009], Lines 1-12, [0081], Lines 104, [0088], Lines 1-7, and [0087], Lines 1-12, teaches estimated accuracy using (correlation taught as a suitable method) the pixel between a reference data set (data from a previous frame) an the feature set (data extracted based on region around a position estimated by the motion vector, where correlation determines a range (normalized) with a maximum of 1, where 0 indicates no relationship, and a value of either -1 or 1 represent a strong relationship)).

As to Claim 27, the combination of Sun and Margarey teach the image processing apparatus according to claim 21, wherein the accuracy computing means determines a value normalized from the evaluation value with respect to the variable value to be the accuracy of the motion vector when the variable value is greater than a predetermined threshold value and wherein the accuracy computing means determines a fixed value indicating that the accuracy of the motion vector is low when the variable value is less than the predetermined threshold value (Margarey, Fig. 2A, Fig. 2B, [0008], [0009], [0072], [0079], [0081], [0088], [0087], [0130], compares the correlation to a threshold).

As to Claim 28, the combination of Sun and Margarey teach the image processing apparatus according to claim 21, wherein the evaluation value computing means computes the evaluation value representing the sum of absolute differences between pixels in a block including the pixels of interest and pixels in a block including the corresponding pixels (Margarey, [0008], Lines 1-5, [0087], Lines 1-12, a (variable) the sum of difference in the block values is calculated by the sum of differences (variation) between pixel values in a block of the reference data set and the block of feature set (pixels of interest)).

As to Claim 33, the combination of Sun and Margarey teach the image processing apparatus according to claim 21, further comprising:

average value computing means for computing the average of the accuracy of the motion vectors in the unit of processing (Margarey, Fig.6, [0007], [0087],);

and determining means for comparing the average computed by the average value computing means with a reference value and determining the presence of a scene change on the basis of the comparison result (Margarey, Fig 6, [0087], [0143]).

As to Claim 34, the combination of Sun and Margarey teach the image processing apparatus according to claim 33, wherein the average value computing means computes one average for one unit of processing (Margarey, [0007], Fig.6, operates on the current frame).

B.) Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun in view of Sawasaki et al. (US Patent # 5,838,365 hereinafter Sawasaki).

As to Claim 14, Sun teaches the image processing apparatus according to claim 6, further comprising: template generating means for generating a template (Sun, Column 1, Lines 36-40, Column 7, Lines 37-46). However, Sun is silent to additional including a correlation computing means for computing a correlation between a block representing a predetermined region in the next unit of processing and a block representing a predetermined region of the template in a unit of processing more previous than the unit of processing of the block by one or more units of processing when the second point is not determined on the basis of the estimated points; wherein

the tracking point is detected by using at least the determining means when the correlation is determined to be high on the basis of the correlation computed by the correlation computing means.

Sawasaki teaches a correlation computing means for computing a correlation between a block representing a predetermined region in the next unit of processing and a block representing a predetermined region of the template in a unit of processing more previous than the unit of processing of the block by one or more units of processing when the second point is not determined on the basis of the estimated points (Sawasaki, Fig. 3, Column 7, Lines 18-30); wherein the tracking point is detected by using at least the determining means when the correlation is determined to be high on the basis of the correlation computed by the correlation computing means (Sawasaki, Fig. 39, Column 62-67, Column 21, Lines 1-26).

It would have been obvious to one of ordinary skilled in the art at the time of inventions to modify the image processing apparatus of Sun, by additionally computing a correlation between a block representing a predetermined region in the next unit of processing and a block representing a predetermined region of the template in a unit of processing as taught by Sawasaki in Fig. 39 above. Sun and Sawasaki are analogous in the art of image processing specifically in the field of object tracking, and Sawasaki addresses the same problem solving area of image based tracking of objects to determine if the object's location is estimable in the current frame. One of ordinary skilled in the art would have been motivated to combine the teachings of Sawasaki to the apparatus of Sun in order to use the images obtained from Sun's image processing

apparatus and then determine if the motion vector is accurate by evaluating the correlation value between the feature vectors in the blocks in the manner described by Sawasaki to provide a robust, quick, adaptive, and repeatable approach to tracking regions when issues such as occlusion occurs through a sequence of images (Sawasaki, Abstract, Column 1, lines 10-22).

As to Claim 15, the combination of Sun and Sawasaki teach the image processing apparatus according to claim 14, wherein the template generating means determines a predetermined region around the tracking point to be the template (Sawasaki, Fig. 39, Column 62-67, Column 21, Lines 1-26).

As to Claim 16, the combination of Sun and Sawasaki teach the image processing apparatus according to claim 14, wherein the template generating means generates the template on the basis of the target region (Sun, Column 1, Lines 36-40, Column 7, Lines 37-46).

As to Claim 17, the combination of Sun and Sawasaki teach the image processing apparatus according to claim 14, wherein, when the correlation is determined to be high on the basis of the correlation computed by the correlation computing means (Sawasaki, Fig. 39, Column 62-67, Column 21, Lines 1-26), the

second point is determined on the basis of a relationship between the block representing the predetermined region of the template in a unit of processing more previous than a block representing the predetermined region in the next unit of processing by one or more units of processing and the tracking point and on the basis of the position of the block having the correlation determined to be high (Sawasaki, Fig. 39, Column 62-67, Column 21, Lines 1-26).

As to Claim 18, the combination of Sun and Sawasaki teach the image processing apparatus according to claim 14, wherein the template generating means determines a region formed from a sample point in the target region and a predetermined area around the sample point to be the template (Sawasaki, Fig. 39, Column 62-67, Column 21, Lines 1-26).

As to Claim 19, the combination of Sun and Sawasaki teach the image processing apparatus according to claim 14, wherein the correlation computing means determines the correlation by computing an error between the block in the next unit of processing and a block of the template in a unit of processing more previous than the unit of processing of the block by one or more units of processing (Sawasaki, Fig. 39, Column 62-67, Column 21, Lines 1-26).

C) Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sun in view of Sawasaki and further in view Itokawa et al. (US Patent # 7,024,040 hereinafter Itokawa).

As to Claim 32, the combination of Sun and Margarey teach the image processing apparatus according to claim 21, However the combination of Sun and Margarey is silent to wherein further comprising: frequency distribution computing means for computing a frequency distribution weighted with the accuracy of the motion vector and maximum value detecting means for detecting a maximum value of the frequency distribution computed by the frequency distribution computing means and detecting a background motion on the basis of the detected maximum.

Itokawa teaches a background motion tracking and compensation using a frequency distribution computing means for computing a frequency distribution weighted with the accuracy of the motion vector (Itokawa, Fig. 6, Column 6, Lines 51-60); and maximum value detecting means for detecting a maximum value of the frequency distribution computed by the frequency distribution computing means and detecting a background motion on the basis of the detected maximum value (Itokawa, Fig. 11, Column 6, Lines 51-60).

It would have been obvious to one of ordinary skilled in the art at the time of inventions to modify the image processing apparatus of the combination of Sun and Margarey, by additionally computing the background motion using the maximum value in the frequency distribution as background as taught by Itokawa in Figure 11. The

combination of Sun and Margarey and Itokawa are analogous in the art of image processing specifically in the field of object tracking, and Itokawa addresses the same problem solving area of image based tracking of objects to determine if the object's location is estimable in the current frame. One of ordinary skilled in the art would have been motivated to combine the teachings of Itokawa to the apparatus of the combination of Sun and Margarey in order to use the images obtained from the combinations' image processing apparatus and then determine the background motion vector using the frequency of motion vector values in the manner described by Itokawa to provide a robust, and repeatable approach to tracking regions accurately when background motion is introduced in the sequence of images (Itokawa, Column 2, lines 16-23).

D) Claims 35-37 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun in view of Kondo et al. (PGPub # US 2003/0156203, hereinafter Kondo).

As to Claim 35 and Claim 45, Sun teaches the image processing apparatus according to claim 1 and the method according to claim 43, respectively. However, Sun is silent to further comprising: first-point detecting means for detecting the first point of a moving object in an image; correction area setting means for setting a correction area having a predetermined size around the object in the image on the basis of the estimation result; correcting means for correcting the image in the correction area in the

image; and display control means for controlling the display of the image including the image in the correction area corrected by the correcting means.

Kondo teaches a first-point detecting means for detecting the first point of a moving object in an image (Kondo, Fig.4, el 101, Fig. 22, [0004], Lines 1-7, [0142], Lines 1-8, [0145], Lines 1-9, and [0154[, Lines 1-7, detects points on a moving object in an image, these point(s) are used to track the object through other images); correction area setting means for setting a correction area having a predetermined size around the object in the image on the basis of the estimation result (Kondo, Fig. 21, [0145], Fig.4, el 103, Lines 4-8, [0150], Lines 1-7, [0154], Lines 1-8, and [0155], Lines 1-8, an area surrounding the object is determined along with the blur mixture to aid in determining foreground and background pixels); correcting means for correcting the image in the correction area in the image (Kondo, Fig. 21, Fig.4, el 106, [0145], Lines 4-8, [0154], Lines 1-8, and [0155], Lines 1-16, a correction is determined for adding or removing the blurred pixels to the extracted foreground area (object) of an image); and display control means for controlling the display of the image including the image in the correction area corrected by the correcting means (Kondo, Fig. 3, Fig.4, el 107, [0132], Lines 1-7, [0154], Lines 1-8, [0155], Lines 1-16, and [0156], Lines 1-7, the input unit for control can be a keyboard, input unit , etc and the output unit can be display unit, and a motion blur adjuster can be used to vary (control) the blur pixels that are included in the foreground image (the image to be displayed)).

It would have been obvious to one of ordinary skilled in the art at the time of inventions to modify the image processing apparatus of Sun, by additionally correcting

the image in regions around a moving target as taught by Kondo in Figure 21. Sun and Kondo are analogous in the art of image processing specifically in the field of object tracking. One of ordinary skilled in the art would have been motivated to combine the teachings of Kondo to the apparatus and method of Sun in order to use the images obtained from Sun's image processing apparatus/method and then correct the moving regions in the manner described by Kondo to provide a tracking algorithm that is able to better determine whether a blurred pixel is belongs as an object in the foreground image, resulting in a better extraction of objects in motion for matching and modeling (Kondo,[0002] – [0004]).

As to Claim 36, the combination of Sun and Kondo teach the image processing apparatus according to claim 35, wherein the correcting means corrects blurring of the image (Kondo, Fig. 4, El 106, Fig. 21, [0139], Lines 1-4, [0155], Lines 7-16, the motion blur is corrected by determining if the blurred point is contained in the foreground component).

As to Claim 37, the combination of Sun and Kondo teach the image processing apparatus according to claim 36, wherein the correcting

means includes:

delivering means for delivering a control signal for identifying an image in the correction area and a parameter indicating the level of blurring of the image; (Kondo, [0155], Abstract, Fig. 4, [0142], [0150], provides a correction area which surrounding a foreground object and parameter of movement, v, which represents the level of motion blur in the foreground image) feature detecting means for detecting the feature of the image in the correction area identified on the basis of the control signal and outputting a feature code representing the detected feature; (Kondo, [0142], [0150], teaches a feature detecting means which determines the foreground objects from background, using the movement parameter and level of motion blur in the image) storage means for storing the parameter representing the level of blurring of the image and a coefficient corresponding to the feature code output from the feature detecting means (Kondo, Fig. 2, “Signal Processor” these computed values are stored in memory on a cpu and are read (e.g. in memory) when used for computation); readout means for reading out the parameter and the coefficient corresponding to the feature code output from the feature detecting means from the storage means (Kondo, [0509], the program requires reading out the determined parametrers for its computation, for example, reading out from the unit of processing determiner a correction value (movement v), which corresponds to the amount of movement o, the related feature codes (FO1/V - FO8/V)); Inner-product computing means for computing the inner product of the values of pixels in the input image on the basis of the coefficient read out by the readout means; (Kondo, [0491], teaches multiplying the pixel value by correction value (i.e. the inner product of two real numbers) to determine the foreground component in the image),

and selectively-outputting means for selecting one of the computation result from the inner-product computing means and the value of the pixel of the input image and outputting the selected one (Kondo, [0600]; el 907)

wherein the image in the correction area is corrected so that blurring of the image is removed (Kondo, Fig. 4, El 106, Fig. 21, [0139], Lines 1-4, [0155], Lines 7-16, the motion blur from the object can be correct by removing the motion blur, or the adjuster can decrease or increase the amount of motion blur contained in the foreground component).

E). Claims 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sun as applied to Claims 7 above, in view of Official Notice.

As to Claim 8, Sun teaches the image processing apparatus according to claim 7. However, Sun does not explicitly teach wherein the shape of the region estimation range is fixed.

It would have been obvious to one of ordinary skilled in the art at the time of inventions to modify the teachings of Sun so that the method includes the shape of the region estimation range is fixed. One of ordinary skilled in the art would have been motivated to modify Sun in such a way so as to provide a robust and easy to implement method for comparing regions to determine if a track is determined, by using a shape region estimation range that is fixed, such as window.

Allowable Subject Matter

1. Claims 29-31, 38-42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

2. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Allmen et al., US 6738424 B1, Scene model generation from video for use in video processing

Harman, US 20020191841 A1, Image processing method and apparatus

Jepson et al., US 20030219146 A1, Visual motion analysis method for detecting arbitrary numbers of moving objects in image sequences

Legall, US 5878166 A, Field frame macroblock encoding decision

Mehrotra et al., US 6665423 B1, Method and system for object-oriented motion-based video description

Rigney et al., US 6985172 B1, Model-based incident detection system with motion classification

Sambonsugi et al., US 6335985 B1, Object extraction apparatus

Schonfeld et al., US 7142600 B1, Occlusion/disocclusion detection using K-means clustering near object boundary with comparison of average motion of clusters

to object and background motions

Schonfeld et al., US 7095786 B1, Object tracking using adaptive block-size matching along object boundary and frame-skipping when object motion is low

Sethuraman et al., US 6643387 B1, Apparatus and method for context-based indexing and retrieval of image sequences

Sugano et al., US 6473459 B1, Scene change detector

Tamir et al., US 5923365 A, Sports event video manipulating system for highlighting movement

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Heidemann whose telephone number is (571)-270-5173. The examiner can normally be reached on Monday - Thursday/7:30 A.M. to 5:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone numbers for the organization where this application or proceeding is assigned are 571-273-8300 for regular communications and 571-273-8300 for After Final communications. TC 2600's customer service number is 571-272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason Heidemann/ 12/28/2009
Examiner, Art Unit 2624

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Primary Examiner, Art Unit 2624